

CARNEGIE MELLON UNIVERSITY

MAGNET TECHNOLOGY FOR POWER CONVERTERS

PROJECT TITLE:	Nanocomposite Magnet Technology for High Frequency MW-Scale Power Converters		
ORGANIZATION:	Carnegie Mellon University (CMU)	LOCATION:	Pittsburgh, PA
PROGRAM:	Solar ADEPT	ARPA-E AWARD:	\$ 1,171,369
TECH TOPIC:	Power Conversion	PROJECT TERM:	2/27/12 – 2/26/15
WEBSITE:	arpa.e.energy.gov/ProgramsProjects/SolarADEPT.aspx		

CRITICAL NEED

Photovoltaic (PV) solar systems convert the sun’s energy into electricity, but only a small percentage of the sunlight that reaches a PV system is converted into useful electricity. This is due in part to the inefficient and failure-prone electrical components used in most PV systems today. Improving the performance of these components would lower the overall cost of PV systems—helping to make renewable solar energy cost-competitive with conventional, nonrenewable forms of electricity generation.

PROJECT INNOVATION + ADVANTAGES

CMU is developing a new nanoscale magnetic material that will reduce the size, weight, and cost of utility-scale PV solar power conversion systems that connect directly to the grid. Power converters are required to turn the energy that solar power systems create into useable energy for the grid. The power conversion systems made with CMU’s nanoscale magnetic material have the potential to be 150 times lighter and significantly smaller than conventional power conversion systems that produce similar amounts of power.



IMPACT

If successful, Carnegie Mellon would help reduce the cost of converting solar energy into useable power for the grid—facilitating the cost-effective grid integration of PV systems.

- **SECURITY:** Lowering the cost of PV systems would help increase the use of solar energy, which in turn would decrease our dependence on fossil fuels and improve U.S. energy security.
- **ENVIRONMENT:** Solar energy systems create zero harmful emissions while providing energy to homes and businesses, so their widespread use would significantly improve air quality.
- **ECONOMY:** This project could help position the U.S. as a leader in power electronics industry.
- **JOBS:** Widespread use of residential and commercial PV systems could create jobs for system installers, technicians, and salespeople.

CONTACTS

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